Beliefs About the Motivational Benefits of Feedback Predict Well-Being

THESIS

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Abstract

Research demonstrates that resilience (i.e. a person's ability to maintain motivation in the face of feedback; Noble & McGrath, 2012) is associated with greater well-being (i.e. a person's quality of mental health; Huppert, 2009). Past research has demonstrated the motivating role of both positive and negative feedback in goal pursuit (Fishbach, Eyal, & Finklestein, 2010). Whereas positive feedback promotes motivation in situations where people question their commitment to a goal, negative feedback promotes motivation in situations where people question their progress toward a goal. Less is known about whether people understand the benefits of positive and negative feedback. To examine this question, we took a metamotivational approach, which assesses whether people understand how motivation works. Specifically, we sought to examine whether people understand how to be resilient in goal pursuit—i.e., understand the motivational benefits of positive and negative feedback in different goal situations. We also aimed to examine whether people who understand the motivational benefits of positive and negative feedback would experience better well-being. To evaluate these questions, we recruited students (N =110) to complete a scenario-based knowledge assessment that measured the extent to which they understood the motivational benefits of positive vs. negative feedback in situations where they questioned their goal commitment vs. goal progress. Students also completed an assessment of well-being that included measures such as depression (Radloff, 1977), anxiety (Spitzer et al., 2006), and negative affect (Watson et al., 1988) at three time points in the semester. Our findings revealed that students held relatively accurate beliefs about the motivational benefits of positive and negative feedback. Specifically, students recognized that positive feedback serves to reaffirm one's commitment (vs. push them to make progress). By contrast, students understood that negative feedback serves to push one to make

progress (vs. reaffirm one's commitment). Importantly, individual differences in these beliefs predicted lower levels of negative affect, depression, and anxiety across a semester. This study highlights the importance of examining the role of people's knowledge about how to be resilient in well-being.

Keywords: evaluative feedback, goal pursuit, resilience, well-being

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Introduction

Understanding Well-Being and Resilience

The study of well-being spotlights what leads to people's experience of leading a healthy and functional life (Huppert, 2009). Specifically, well-being is a person's quality of mental health. Past research has shown that there are several factors related to a person's well-being (Noble, McGrath, Roffey, & Rowling, 2008). These factors include but are not limited to exercising regularly, being kind to others, having positive social relationships, and being resilient (Huppert, 2009; Noble & McGrath, 2012). Resilience refers to a self-regulatory skill that people use to overcome a challenge, hardship, or adversity (Noble & McGrath, 2012). People can be resilient both physically (e.g. healing quickly from an injury) and emotionally (e.g. successfully coping with negative emotions). Given the benefits of being resilient, the present study will examine whether people know how to be resilient and whether this knowledge is related to well-being.

Past research has revealed a positive link between resilience and well-being in work, academic, and health contexts. For example, in studies evaluating burnout in various occupations, researchers assessed participants' self-reported levels of resilience by asking how they respond to the stressors of their jobs. These studies found a link between workers' ability to overcome challenges (resilience) and less burnout at work (Howard & Johnson, 2004; Watson, Saggar, MacDowell, & McCoy, 2019; de Vera García & Gambarte, 2019). Additionally, research has shown that higher resilience is related to better performance in school. Students' self-reported resilience (i.e., ability to overcome challenges in their personal and academic lives) predicted increased chances of graduation as well as higher grades (Ellison & Mays-Woods, 2019; Brown, Yu, Hewitt, Isbel, Bevitt, Etherington, 2019), factors that are related to better

physical and mental health (Herd, 2010). Lastly, and most closely related to the present study, past research has examined the role of resilience in depression and anxiety. Specifically, Jaureguizar, Garaigordobil, and Bernaras (2018) found that among students with higher self-reported resilience, the typical positive relationship between stress and depression was eliminated. King, Carr, and Taylor (2019) also found that self-reported resilience attenuated depressive symptoms following adverse experiences (e.g., bereavement). Given the role of resilience in well-being, the current research aims to examine if people understand how to be resilient. Examining this may inform future interventions that aim to increase well-being.

Evaluative Feedback

To examine this question, the present study focuses on a specific type of adversity: receiving evaluative feedback in goal pursuit. We conceptualize resilience in goal pursuit as maintaining motivation toward the goal in the face of feedback. In goal pursuit, people often receive evaluative feedback from sources such as coaches, mentors, teachers and more. Past research has shown that evaluative feedback can either increase or decrease people's motivation, depending on how they are thinking about their goal (Fishbach, Eyal, & Finklestein, 2010; Koo & Fishbach, 2008). Importantly, past work demonstrates that both positive and negative feedback can motivate people to persist in goal pursuit, depending on whether the person is considering their commitment to or progress toward the goal (Fishbach & Dhar, 2005; Fishbach et al., 2010; Fishbach, Zhang, & Koo, 2009; Koo & Fishbach 2008).

Specifically, when people question their commitment to a goal, positive (vs. negative) feedback will better promote motivation. Goal commitment is defined as the psychological investment of effort toward attaining a valued goal—investment that may change as a function of goal expectancy and goal value (Fishbach et al., 2009). For example, imagine a few beginning

thesis students who are questioning whether they should continue in their goal of pursuing a thesis, or if it is the right goal for them. Now imagine they received positive feedback from their advisors. Positive feedback should help in reaffirming the students' commitment to the goal and increase their motivation to pursue a thesis. By contrast, imagine that they instead received negative feedback from their thesis advisors. Negative feedback should decrease their motivation and may cause them to quit their goal. In sum, positive feedback should be more motivating than negative feedback when people are questioning their goal commitment.

Alternatively, when people question their progress toward a goal, negative (vs. positive) feedback will promote motivation. Goal progress is defined as a sense of moving forward on a goal and reducing (increasing) discrepancy to a desired (an undesired) end state (Fishbach et al., 2009). For example, imagine a few devoted thesis students who are questioning whether they are doing enough to complete their thesis on time. Now imagine they received positive feedback from their advisors. Positive feedback should signal that they have done enough and decrease their motivation to work. Contrastingly, imagine that they instead received negative feedback from their advisors. Negative feedback should signal that they have not done enough and increase their motivation to work harder toward their goal. In sum, negative feedback should be more motivating than positive feedback when people are questioning their goal progress.

These predictions are supported by research. For example, Koo and Fishbach (2008) assessed the impact of feedback among people who were questioning their goal commitment or goal progress. Specifically, from a charity's contact list, they recruited people who have never donated (i.e., potential donors who are questioning their commitment to the charity) and people who regularly donate (i.e., committed donors who are questioning the progress they have made for the charity). When the researchers reached out to the participants to ask for a donation, they

manipulated whether participants received negative or positive feedback about how well the charity's fundraising campaign was doing. Specifically, half of the donors read positive feedback about how the charity raised half their fundraising goal whereas the other half read negative feedback about how the charity still needed to raise the remaining half of their fundraising goal. As expected, those who never donated before (i.e., those who were questioning their commitment) were more likely to donate after receiving positive (vs. negative) feedback, whereas those who regularly donate (i.e., those who were questioning their goal progress) were more likely to donate after receiving negative (vs. positive) feedback. In another study, Louro, Pieters, and Zeelenberg (2007) examined dieters' reactions to both positive and negative feedback. They recruited dieters who were beginners (i.e., those who were questioning their commitment) vs. more experienced (i.e., those who were questioning their progress). As expected, Louro and colleagues (2007) found that more experienced dieters were more motivated by negative (vs. positive) feedback. Additionally, the dieters who were beginners were more motivated by positive (vs. negative) feedback. These studies demonstrate the motivational benefits of both positive and negative feedback, depending on how people thought about the goal.

Metamotivational Knowledge of the Benefits of Feedback

The present research aims to understand whether people know the motivational benefits of positive and negative feedback in goal pursuit. To examine this question, we borrow methods from a recent approach in motivation science called metamotivation that examines people's knowledge of how motivation works (Scholer & Miele, 2016; Scholer, Miele, Murayama, & Fujita, 2018). Metamotivation research suggests that motivation regulation is important, given that motivation drives people's thoughts, feelings and behavior. To regulate motivation, one

must understand how motivation works. To test if people have knowledge of how motivation works, metamotivation researchers created knowledge assessments similar to assessments from research on tacit knowledge (Wagner & Sternberg, 1985). These metamotivational knowledge assessments presented participants with different regulatory tasks and asked people to rate the benefits of different motivational strategies for task performance. Previous metamotivational research used more indirect assessments, given that metamotivational knowledge is thought to be tacit or implicit. That is, people may not be able to articulate what they know, but instead may be able to indicate what feels right in a certain situation. Previous metamotivational research also found that people do indeed, on average, possess accurate metamotivational knowledge in the context of regulatory focus theory (Scholer & Miele, 2016) and construal level theory (Nguyen, Carnevale, Scholer, Miele, & Fujita, 2019). Importantly, past work also shows that metamotivational knowledge in the context of construal level theory predicts positive outcomes, such as academic performance and dieting success (MacGregor, Carnevale, Dusthimer, & Fujita, 2017; Scholer & Miele, 2016). Thus, the present research adopts a metamotivational approach to examine whether people know how motivation works in the context of evaluative feedback.

The Present Research

In the present research, we aimed to examine whether people have knowledge of how to be resilient (i.e., maintain motivation during goal pursuit in the face of feedback). We also aimed to explore whether this knowledge predicts well-being. To answer these research questions, we conducted a two-part study that first assessed people's knowledge of the motivational benefits of feedback in Part 1. Part 2 introduced a longitudinal component to the study, where we examined whether this knowledge predicts well-being (i.e. depression, anxiety, negative affect) over the course of a semester. We expected to find that people, on average, possess accurate

understanding of how to maintain their motivation in the face of evaluative feedback. Moreover, given that past research demonstrates the role of resilience in well-being, we expected to find a positive relationship between people's knowledge of how to be resilient and their well-being. These expected findings may help shine further light into potential ways to promote resilience and well-being.

Method

Participants

At the beginning of the semester (Time 1: week 2 and 3), we recruited 111 participants (M_{age} = 19.26, SD_{age} = 1.61, 36 females, 73 males, 2 unidentified) through The Ohio State University's Research Experience Program (REP) in the Psychology Department. For compensation, the participants were awarded academic credit for their PSYCH 1100 class. We followed up with participants at the middle (Time 2: week 7 and 8; around midterms) and end of the semester (Time 3: week 12 and 13; before finals), we were able to recruit 82 and 73 participants respectively.

Procedure and Materials

At Time 1, we invited participants (maximum of 10 per session) into the laboratory to complete the survey on the computer. We first measured participants' knowledge of how to be resilient in an assessment. Specifically, this assessment evaluated whether or not participants understood the motivating role of feedback in situations where they are concerned with their goal commitment or goal progress. Participants first read that they can consider their goals in terms of if they are making sufficient progress or if they are sufficiently committed. Participants then read that for the next four scenarios, they should consider whether they are making sufficient progress

on the goal.[1] Subsequently, participants read four goal progress scenarios in which they held imagined goals. Each scenario that we presented to participants pertained to one of the four goal domains we created to be relevant to college students: school, work, health, and finances. For example, a goal progress scenario about health read: "Imagine you have the goal to increase the amount of cardio exercise you do each week to improve your heart health. You keep a log of your workouts and over the last few months, you notice some weeks you did well, but other weeks not so well. To increase your motivation to continue pursuing the goal, you want feedback that will push you to make progress on the goal." Next, we asked participants to rate the extent to which negative feedback (e.g., "Your trainer tells you that you have not been doing enough cardio") pushed them to make progress on their goal (1 = *not at all*, 5 = *a great deal*). Afterward, we asked participants to rate the extent to which positive feedback (e.g., "Your trainer tells you have been doing enough cardio") would push them to make progress on their goal (1 = *not at all*, 5 = *a great deal*).

Next, participants read that for the next four scenarios, they should consider whether they are sufficiently committed to a goal. Participants read four goal commitment scenarios about the same four domains of school, work, health, and finances. For example, a goal commitment scenario about health read: "Imagine you have a goal to eat five servings of fruits and vegetables each day to improve your health. On some days you did well, on others you did not. To increase your motivation to continue pursuing the goal, you want feedback that will reaffirm your commitment to the goal." Next, we asked participants to rate the extent to that negative feedback (e.g., "Your doctor tells you that you have not been eating enough fruits and vegetables")

[1] Previous research suggests that order does not play a role when assessing knowledge about evaluative feedback (Nguyen, Ayres, & Fujita, *in prep*).

reaffirmed their commitment to the goal (1 = *not at all*, 5 = *a great deal*). Afterward, participants rated the extent to which positive feedback (e.g., "Your doctor tells you have been eating enough fruits and vegetables") reaffirmed their commitment to the goal (1 = *not at all*, 5 = *a great deal*).

We also asked participants to complete an assessment of well-being. Within this assessment, we measured participants' depression, anxiety, and negative affect. Participants completed the Center for Epidemiologic Studies Depression Scale (CES-D) and rated how often they felt or behaved in certain ways during the past week (e.g., "I was bothered by things that usually don't bother me"; Radloff, 1977). Participants completed the Generalized Anxiety Disorder-7 (GAD-7) and reported how often they had been bothered by specific problems over the past 2 weeks (e.g., "feeling nervous, anxious, or on edge"; Spitzer, Kroenke, Williams & Lowe, 2006). Lastly, participants completed the Negative Affect Scale (e.g., distressed, upset, irritable) from the Profile of Negative and Positive Affective States (PANAS; Watson, Clark & Tellegen, 1988) and indicated to what extent they felt a certain way in the past two weeks. To compute indicators of well-being, we averaged the items in the depression ($\alpha = .90$), anxiety ($\alpha = .88$), and negative affect ($\alpha = .82$) scales.

At the end of the lab session, participants reported their demographics and responded to our attention checks. Specifically, we collected the participants' email, age, race, gender, ethnicity, and primary language. We lastly directed participants to campus resources for mental health, if needed. At Time 2 and 3 of the longitudinal study, we distributed an online survey containing the well-being assessment to the participants via email.

Results

Knowledge of How to Be Resilient

To maximize statistical power, we did not exclude any participants. To assess participants' knowledge of the motivational benefits of positive and negative feedback, we conducted a 2 (scenario: commitment vs. progress) x 2 (feedback: positive vs. negative) repeated measures ANOVA. There was a significant main effect of scenario type (commitment vs. progress), $F(1, 110) = 4.15$, $p = 0.04$, $\eta p^2 = 0.04$. Specifically, people gave higher ratings for commitment scenarios ($M = 3.55$, $SD = 0.65$) than progress scenarios ($M = 3.47$, $SD = 0.62$). There was a marginal main effect of feedback type (positive vs. negative), $F(1, 110) = 3.55$, $p = 0.06$, $\eta p^2 = 0.03$. Specifically, people gave higher ratings for positive feedback ($M = 3.59$, $SD = 0.76$) than negative feedback ($M = 3.43$, $SD = 0.72$). Importantly, these main effects were qualified by the predicted interaction between scenario and feedback $F(1, 110) = 17.88$, $p < .001$, $\eta p^2 = 0.14$ (see Figure 1).

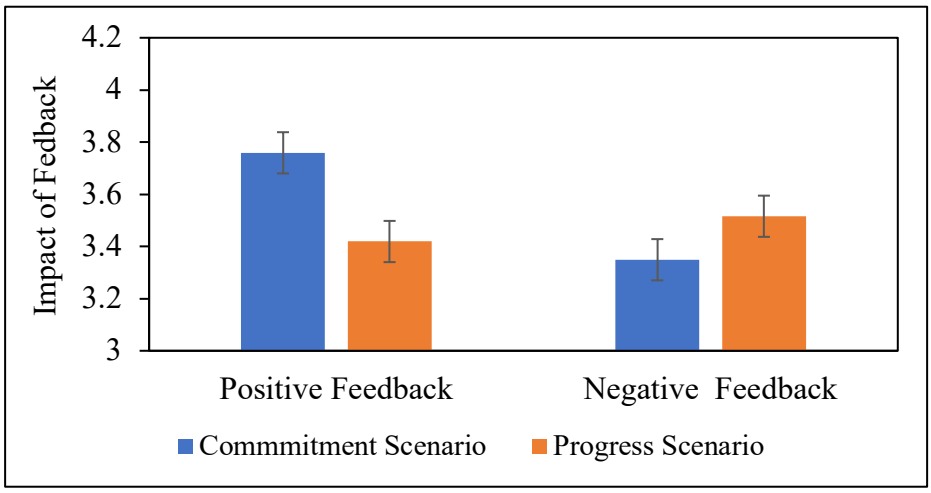

Figure 1. Motivating role of positive and negative feedback within commitment and progress scenarios. Error bars indicate +/- 1 SE. Original scale of the Y-axis ranges from 1 to 7.

We first examined the interaction as a function of feedback. Participants reported that receiving positive feedback would reaffirm their commitment ($M = 3.76$, $SD = 0.08$) more so than push them to make progress ($M = 3.42$, $SD = 0.83$), $t(110) = 4.63$, $p < .001$. Participants rated that negative feedback would push them to make progress ($M = 3.53$, $SD = 0.79$) more so

than reaffirm their commitment (M = 3.35, SD = 0.85), $t(110) = 2.27$, $p = 0.02$. We next examined the same interaction as a function of scenario type. As expected, participants reported that positive feedback would help reaffirm their commitment to a greater extent than negative feedback, $t(110) = 3.84$, $p < .001$. Participants rated that negative feedback would push them to make progress on their goal slightly more than positive feedback but this difference was not statistically significant, $t(110) = 0.99$, $p = 0.32$. Importantly, these results answer our first research question by showing that participants, on average, have knowledge of how to be resilient.

Knowledge of How to Be Resilient Predicts Well-Being

To prepare our data to test our second research question of whether participants' knowledge of how to be resilient is related to greater well-being, we calculated two knowledge variables. We first computed a variable to represent progress knowledge—participants' understanding of the motivational benefits of negative (vs. positive) feedback for motivating goal progress (progress knowledge = participants' ratings of negative feedback in progress scenarios – participants' ratings of positive feedback in progress scenarios). We computed a second variable to represent commitment knowledge—participants' understanding of the motivational benefits of positive (vs. negative) feedback for reaffirming goal commitment (commitment knowledge = participants' ratings of positive feedback in commitment scenarios – participants' ratings of negative feedback in commitment scenarios). Commitment knowledge was marginally higher than progress knowledge, $t(110) = 1.89$, $p = 0.06$. Additionally, progress knowledge (M = .10, SD = 0.10) and commitment knowledge (M = .41, SD = 0.11) were negatively correlated $r(110) = -.32$, $p = .001$ (see Table 1 for correlations with well-being measures).

Table 1

Correlations between progress knowledge, commitment knowledge, and well-being variables.

	1	2	3	4	5	6	7	8	9	10
1. Time 1 Progress Knowledge	-									
2. Time 1 Commitment Knowledge	-.32***	-								
3. Time 1 Depression	-.28**	.06	-							
4. Time 1 Anxiety	-.26**	.10	.77***	-						
5. Time 1 Negative Affect	-.30**	.14	.56***	.51***	-					
6. Time 2 Depression	-.23†	.001	.78***	.68***	.55***	-				
7. Time 2 Anxiety	-.17	.01	.59***	.60***	.48***	.71***	-			
8. Time 2 Negative Affect	-.08	-.04	.49***	.49***	.57***	.64***	.57***	-		
9. Time 3 Depression	-.23	-.03	.49***	.49***	.42***	.64***	.63***	.38†	-	
10. Time 3 Anxiety	-.30**	-.02	.64***	.67***	.51***	.67***	.73***	.58***	.80***	-
11. Time 3 Negative Affect	-.38**	.01	.43**	.45***	.46***	.63***	.66***	.57***	.78***	.78***

Note: † $p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.

To ensure that attrition in study participation was not related to levels of depression, anxiety, or negative affect, we ran a one-way ANOVA. In this, we compared the levels of the mental health measures of the participants who completed the study at all three times, those who completed two of the three, and those who only completed one of the three. The analyses suggest that there was no significant difference in depression, $p = .33$, anxiety, $p = .67$, and negative affect, $p = .85$, between those who completed different amounts of follow-up sessions.

To test whether participants' knowledge of how to be resilient predict their well-being, we ran three different hierarchical linear models. First, we regressed depression on time (0 = Time 1, 1 = Time 2, 2 = Time 3), progress knowledge, commitment knowledge, time x progress knowledge, and time x commitment knowledge. Participants were modeled as random intercepts. We ran two additional models with the same predictors, modeling anxiety and negative affect as the dependent variables, respectively.

Depression. Time significantly predicted depression, $\gamma = .08$, $SE = 0.03$, $t(122.76) = 2.85$, $p = .005$, suggesting that participants' depression levels increased across time. As expected, progress knowledge significantly predicted lower depression, $\gamma = -.14$, $SE = 0.05$, $t(133.31) = -2.81$, $p = .006$. This reveals that people who understand the motivational benefits of negative feedback report less depression than those who do not. By contrast, commitment knowledge did not significantly predict depression, $\gamma = -.02$, $SE = 0.05$, $t(133.2) = -.34$, $p = .74$, suggesting those who understand the motivational benefits of positive feedback report similar levels of depression than those who do not. The time x progress knowledge interaction was not significant, $\gamma = -.01$, $SE = 0.03$, $t(120.94) = -.24$, $p = .82$, and the time x commitment knowledge interaction was not

significant, γ = -.02, *SE* = 0.03, *t*(120.8) = -.77, *p* = .44,. These results suggest that the relationship between knowledge and depression did not vary over time.

Anxiety. Time significantly predicted anxiety, γ = -.54, *SE* = .07, *t*(108.26) = -8.18, *p* < .001, indicating that participants' anxiety levels decreased over time. As expected, progress knowledge predicted lower anxiety, γ = -.18, *SE* = 0.08, *t*(109.31) = -2.24, *p* = .03. This reveals that people who understand the motivational benefits of negative feedback report less anxiety than those who do not. By contrast, commitment knowledge did not predict anxiety, γ = -.02, *SE* = 0.08, *t*(109.31) = .24, *p* = .81. The time x progress knowledge interaction was not significant, γ = .03, *SE* = 0.06, *t*(108.26) = -.50, *p* = .62. Similarly, the time x commitment knowledge interaction was not significant, γ = .01, *SE* = 0.06, *t*(107.96) = .124, *p* = .90. These findings suggest that the relationship between knowledge and anxiety did not vary over time.

Negative Affect. Time did not predict negative affect, γ = .03, *SE* = .05, *t*(141.48) = .64, *p* = .52, suggesting that participants' negative affect levels did not change significantly over time. As expected, progress knowledge predicted lower negative affect, γ = -.15, *SE* = 0.07, *t*(164.68) = -2.24, *p* = .03. Again, this reveals that people who understand the motivational benefits of negative feedback report less negative affect than those who do not. By contrast, commitment knowledge did not significantly predict negative affect, γ = -.03, *SE* = 0.07, *t*(163.2) = .42, *p* = .68. The time x progress knowledge interaction was not significant, γ = -.04, *SE* = 0.05, *t*(137.75) = -1, *p* = .31 and the time x commitment knowledge interaction was not significant, γ = -.06, *SE* = 0.05, *t*(137.7) = -1.27, *p* = .21. These findings suggest that the relationship between knowledge and anxiety did not vary over time. In sum, our three well-being outcomes followed similar patterns of results.

Discussion

This research revealed that people, on average, have knowledge about the motivational benefits of positive and negative feedback in goal pursuit. Specifically, people understood that positive (vs. negative) feedback is motivating in situations where a person is questioning their commitment (vs. progress). Our findings also revealed that knowledge of the benefits of feedback predicted well-being. Specifically, students' knowledge of the benefits of negative vs. positive feedback in motivating goal progress (i.e., progress knowledge) predicted lower depression, anxiety, and negative affect. However, students' knowledge of the benefits of positive vs. negative feedback in reaffirming their commitment to a goal (i.e., commitment knowledge) did not predict well-being.

There may be a variety of reasons why progress knowledge, but not commitment knowledge, predicted well-being. Mainly, people may find it easier to understand the benefits of positive feedback but more difficult to understand the motivational benefits of negative feedback. Indeed, among our sample, participants' knowledge of the benefits of positive feedback was slightly higher than their knowledge of the benefits of negative feedback, indicating that it may be more challenging to understand the value of negative feedback. Progress knowledge may be more a diagnostic indicator for distinguishing who has a higher quality of well-being.

The present work offers three main contributions. First, this study expands upon past research on feedback and goal pursuit (Fishbach & Dhar, 2005; Fishbach, Eyal, & Finklestein, 2010; Fishbach, Zhang, & Koo, 2009; Koo & Fishbach, 2008). Past research demonstrated the motivational impact of both positive and negative feedback in goal pursuit, depending on whether people were manipulated to question their goal commitment or progress. In the first study to examine people's knowledge about the benefits of positive and negative feedback, we

found that people's knowledge was generally accurate on average. Additionally, we found that knowledge of the motivational benefits of feedback predicted real-world experiences, such as lower depression, anxiety, and negative affect.

Second, our findings give back to the emerging literature on metamotivation.. The metamotivational approach encourages researchers to examine people's beliefs about how motivation works. We adopted this approach and conducted the first longitudinal study on metamotivation, discovering that people's knowledge of how to be resilient predicts well-being. These findings show that people's metamotivational knowledge may play an important role in people's experiences of well-being. This study may also inform future research taking the metamotivational approach and aiming to examine the relationship between knowledge and regulatory outcomes.

Third, these findings may inform who might succeed vs. fail at achieving their goals. People set many goals for themselves across their lifetime and constantly receive positive and negative feedback. Evaluative feedback does not have to be a mentor telling you what you did well or poorly. It can be the number on the scale when you are trying to lose weight, a bank statement when trying to save money, or a party invitation when trying to be more social. Because evaluative feedback is prevalent in goal pursuit, it is key to understand who appreciates its motivational benefits, and, contrastingly, who struggles with it.

Limitations

This study is not without limitations. As we have previously mentioned, this is the first study to examine whether knowledge of how to stay resilient in goal pursuit predicts well-being. Thus, it would be helpful for future research to replicate our results to test whether they are robust. Additionally, our sample consisted of Ohio State students. It is important to note this

before generalizing the results across other populations. Future research may examine whether these results replicate among an older population of adults. However, past research has documented metamotivational knowledge across both college student and adult samples, suggesting that it is likely for our results to generalize beyond college students.

Additionally, the present study did not find that knowledge of the motivational benefits of evaluative feedback predicts a change in well-being over time. We reason that this could be due to the idea that those with higher knowledge have a more stable quality of well-being. Thus, they may consistently have lower levels of depression, anxiety, and negative affect than those with less knowledge.

Future Directions

Recall that the present study used a knowledge assessment where participants considered a set of imagined goals of four domains more relevant to college students (school, work, health, and finances). However, there is always variation in which goals different people hold. Future research could administer a similar assessment tailored to idiosyncratic goals that the participants currently hold. One might expect that people's knowledge of how to be resilient would be stronger when they are imagining personally meaningful goals. For example, consider a student who holds the goal to get a 4.0 in a semester. Asking them to consider this personally meaningful goal and the motivational impact of positive and negative feedback tailored to this goal may promote greater recognition of the benefits of positive and negative feedback, compared to asking them to consider a goal they may not have. Alternatively, it is also possible that the personal meaningfulness of the goal may interfere with people's recognition of the benefits of positive and negative feedback. That is, if the person personally holds the goal we are asking them to consider, it may make the feedback we provide less believable, as it may not be true to

their real life. It is currently unknown how more personal goals will impact people's knowledge; thus, it would be beneficial for future research to examine this further.

Future research should also examine the role of more extreme feedback. Specifically, the present study used feedback that was moderately positive or negative. Future research could examine people's beliefs about moderate vs. extreme positive and negative feedback. One might predict that people may believe that both moderate and extreme positive feedback would continue to increase their goal commitment. However, one might predict that people believe that extreme (vs. moderate) negative feedback would decrease (vs. increase) motivation to make progress on their goal.

Recall that the present study found that people's knowledge of how to be resilient predicted well-being. Future research could extend this and examine if people's knowledge about how to be resilient in goal pursuit predicts successful goal attainment. One might expect that people who understand (vs. do not understand) how to be resilient would be more likely to reach their goals because they understand the motivational benefits of positive and negative feedback. Further, if people understand what kind of feedback to seek to keep them more motivated when they are questioning commitment to a goal or their progress on a goal, then this knowledge is likely to predict greater goal attainment.

Future research may also inform and/or develop interventions that aim to improve people's knowledge about how to be resilient and ultimately promote their well-being and success in goal pursuit. These interventions can teach people when positive and negative feedback would be useful in goal pursuit. People learning from these interventions would come to understand what type of feedback to focus on when they are considering their goals in different contexts. For example, after the intervention, if a person is wondering whether they

should continue with their fitness goals, they may choose to focus on the positive feedback they received. By contrast, if a person is wondering if they are making enough progress with their fitness goals, they may choose to focus on the negative feedback they received. Because positive and negative feedback are prevalent in people's lives, it is beneficial to teach people when to focus on it in a way that best motivates them.

Additionally, future research may conduct interventions that aim to build effective mentors. Specifically, if feedback providers (e.g. teachers, mentors, supervisors, etc.) learn about the motivational benefits of both positive and negative feedback, they may be more equipped to give the most effective and motivating feedback to their mentees. For example, if a soccer coach finds that one of their players is considering quitting the team, the coach may use positive feedback to encourage their soccer goals and keep them on the field. Additionally, if soccer coach has a committed player that has a goal to get a sports scholarship, the coach may use negative feedback to push them to make more progress to ensure they have the best chances to win the award. In short, future research may create interventions to develop effective feedback-givers.

The present research advances research on resilience and well-being. We found that people do, on average, understand how to be resilient. Specifically, people recognized the motivational benefits of positive and negative feedback. We also demonstrated that this knowledge predicts well-being over time. These findings pave the way for future studies and interventions aiming to promote resilience, well-being, and goal pursuit.

References

Brown, T, Yu, M-L, Hewitt, AE, Isbel, ST, Bevitt, T, Etherington, J. (2019). Exploring the relationship between resilience and practice education placement success in occupational therapy students. *Australian Occupational Therapy*, *67*(1), 49– 61. https://doi.org/10.1111/1440-1630.12622

de Vera García, I.V., & Gambarte, I.G. (2019). Relationships Between the Dimensions of Resilience and Burnout in Primary School Teachers. *International Electronic Journal of Elementary Education, 12*(2), 189-196. https://doi.org10.26822/iejee.2019257666

Ellison, D.W., Mays-Woods, A. (2018). Physical Education Teacher Resilience in High-Poverty School Environments. *European Physical Education Review, 25*(4), 1110-1127. https://doi.org/10.1177%2F1356336X18800091

Fishbach, A., & Dhar, R. (2005). Goals as Excuses or Guides: The Liberating Effect of Perceived Goal Progress on Choice. *Journal of Consumer Research*, *32*(3), 370–377. https://doi.org/10.1086/497548

Fishbach, A., Eyal, T., & Finkelstein, S. R. (2010). How positive and negative feedback motivate goal pursuit. *Social and Personality Psychology Compass*, *4*(8), 517-530. https://doi.org/10.1111/j.1751-9004.2010.00285

Fishbach, A., Zhang, Y., & Koo, M. (2009). The Dynamics of Self-Regulation. *European Review of Social Psychology*, *20*(1), 315-344. https://doi.org/10.1080/10463280903275375

Fujita, K., Scholer, A. A., Miele, D. B., & Nguyen, T. (2019). On Metamotivation: Consumers' Knowledge about the Role of Construal Level in Enhancing Task Performance. *Journal of the Association for Consumer Research*, *4*(1), 57-64. https://doi.org/10.1086/700839

Herd, P. (2010). Education and Health in Late-Life Among High School Graduates: Cognitive versus Psychological Aspects of Human Capital. *Journal of Health and Social Behavior, 51*(4), 478-496. https://doi.org/10.1177/0022146510386796

Howard, S., & Johnson, B. (2004). Resilient Teachers: Resisting Stress and Burnout. *Social Psychology of Education, 8*(1), 399-420. https://doi.org/10.1007/s11218-004-0975-0

Huppert, F. A. (2009). Psychological Well-being: Evidence Regarding its Causes and Consequences. *Applied Psychology: Health and Well-Being*, *1*(2), 137-164. https://doi.org/10.1111/j.1758-0854.2009.01008.x

Huppert, F. A., & So, T. (2009). "What percentage of people in Europe are flourishing and what characterizes them. In *IX ISQOLS Conference"* (pp. 1-7).

Jaureguizar, J., Garaigordobil, M., & Bernaras, E. (2018). Self-concept, Social Skills, and Resilience as Moderators of the Relationship Between Stress and Childhood Depression. *School Mental Health*, *10*, 488–499. https://doi.org/10.1007/s12310-018-9268-1

King, B.M., Carr, D.C., & Taylor, M.G. (2019). Depressive Symptoms and the Buffering Effect of Resilience on Widowhood by Gender. *The Gerontologist, 59*(6), 1122-1130. https://doi.org/10.1093/geront/gny115.

Koo, M., & Fishbach, A. (2008). Dynamics of self-regulation: How (un)accomplished goal actions affect motivation. *Journal of Personality and Social Psychology, 94*(2), 183-195. https://doi.org/10.1037/0022-3514.94.2.183.

Louro, M. J., Pieters, R., & Zeelenberg, M. (2007). Dynamics of multiple-goal pursuit. *Journal of Personality and Social Psychology, 93*(2), 174–193. https://doi.org/10.1037/0022-3514.93.2.174

Lyubomirsky, S., King, L., & Diener, E. (2005). The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin, 131*(6), 803-855. https://doi.org/10.1037/0033-2909.131.6.803

MacGregor, K. E., Carnevale, J. J., Dusthimer, N. E., & Fujita, K. (2017). Knowledge of the self-control benefits of high-level versus low-level construal. Journal of Personality and Social Psychology, 112(4), 607–620. https://doi.org/10.1037/pspp0000130

Nguyen, T., Carnevale, J. J., Scholer, A. A., Miele, D. B., & Fujita, K. (2019). Metamotivational knowledge of the role of high-level and low-level construal in goal-relevant task performance. *Journal of Personality and Social Psychology. 117*(5), 876–899 https://doi.org/10.1037/pspa0000166

Noble, T. & McGrath, H. (2012). Wellbeing and Resilience in Young People and the Role of Positive Relationships. In: Roffey S. (eds) *Positive Relationships: Evidence Based Practice across the World* (17-33). Dordrecht: Springer. https://doi.org/10.1007/978-94-007-2147-0_2

Noble, T., McGrath, H., Roffey, S., & Rowling, L. (2008). A scoping study into approaches to student wellbeing. *Report to the Deaprtment of Education, Employment and Workplace Relations. https://docs.education.gov.au/system/files/doc/other/scoping_study_into_approaches_to_student_wellbeing_final_report.pdf*

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401. https://doi.org/10.1177/014662167700100306

Scholer, A. A., & Miele, D. B. (2016). The role of metamotivation in creating task-motivation fit. *Motivation Science, 2*(3), 171-197. https://doi.org/10.1037/mot0000043

Scholer, A. A., Miele, D. B., Murayama, K., & Fujita, K. (2018). New directions in self-regulation: The role of metamotivational beliefs. *Current Directions in Psychological Science, 27*(6), 437-442. https://doi.org/10.1177/0963721418790549

Spitzer R. L., Kroenke K., Williams, J. B. W., Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine.* 1092-1097. https://doi.org/10.1001/archinte.166.10.1092

Watson, A. G., Saggar, V., MacDowell, C., McCoy, J.V. (2019). Self-reported modifying effects of resilience factors on perceptions of workload, patient outcomes, and burnout in physician-attendees of an international emergency medicine conference. *Psychology, Health, & Medicine, 24*(10), 1220-1234. https://doi.org/10.1080/13548506.2019.1619785

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070. https://doi.org/10.1037//0022-3514.54.6.1063

Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective well-being. *Personality and Social Psychology Bulletin*, *29*(12), 1494-1508.